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4401 Great America Parkway
Santa Clara, CA 95054

Installation and Reference for the BayStack 21 PCI 10/100 Adapter w/WOL

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- Increase the separation between the equipment and receiver.
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Preface

Congratulations on your purchase of a BayStack™ PC network card adapter, the BayStack 21 PCI 10/100 Adapter w/WOL, which supports workgroups operating at 10 Mb/s and/or 100 Mb/s transmission speeds. This network card is intended for use in a desktop workstation. You can use a similar product, the BayStack 22 PC Card Adapter, in a portable (laptop) computer.

Before You Begin

This guide provides information about using the features and capabilities of the BayStack 21 PCI 10/100 Adapter w/WOL.

This guide is intended for Ethernet local area network (LAN) administrators with the following background:

- Working knowledge of PC terminology and operation
- Working knowledge of 10BASE-T (Ethernet) and 100BASE-TX (Fast Ethernet) operations
- Nortel Networks™ network experience

Text Conventions

This guide uses the following text conventions:

bold text	Indicates command names and options and text that you need to enter. Example: Enter **a:**.
separator (>)	Shows menu paths. Example: From the Windows taskbar, choose Start > Settings > Control Panel.

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Technical Solutions Center	Telephone Number
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Santa Clara, CA	800-2LANWAN (800-252-6926)
Valbonne, France	33-4-92-96-69-68
Sydney, Australia	61-2-9927-8800
Tokyo, Japan	81-3-5402-7041

Chapter 1
Introduction

This chapter provides an overview of the BayStack 21 PCI 10/100 Adapter w/ WOL, including its hardware and software components. The BayStack 21 PCI 10/ 100 Adapter w/WOL complements the BayStack 70-Series 10/100 Ethernet Switches and BayStack 60-Series 10/100 Ethernet Hubs.

Note: BayStack 21 PCI 10/100 Adapter w/WOL is sometimes also referred to as the BayStack 21 network card in this document.

BayStack 21 PCI 10/100 Adapter w/WOL Overview

You can install the BayStack 21 PCI 10/100 Adapter w/WOL in the workstations, desktops, or servers of Microsoft® Windows® 95, Windows 98, or Windows NT® users. The network card provides connectivity to the network using the Wake On LAN (WOL) feature, an open standard Advanced Configuration Power Interface (ACPI) function. The standard provides power management support systems through hardware and operating system integration. The motherboard of the workstation must have an ACPI architecture to support this feature.

The WOL feature allows you to turn on a remote workstation. When installed in a workstation that has been turned off, the BayStack 21 network card monitors LAN traffic for valid wake-up frames. When the network card receives the correctly addressed wake-up frame, it sends a signal to the motherboard to turn on the workstation.

Information Technology (IT) organizations sometimes prefer to perform tasks such as installing software, running virus scans, and backing up disk drives during nonbusiness hours to avoid interrupting users during prime usage times. Although organizations may use remote software installation tools or other automated software, IT personnel may have to turn on each workstation for the software to run. This use of IT resources is inefficient and expensive.

The remote wake-up feature gives IT personnel the ability to turn workstations on remotely. You can use the wake-up capability to turn remote machines on automatically, thus further decreasing IT personnel tasks. Workstations that have been turned on can be directed to run virus scans or software upgrades and then to return to a turned off mode. This combination of remote access and automatic wake-up feature saves IT personnel time and increases user productivity by avoiding delays and disruptions during work hours.

Product Features

The BayStack 21 PCI 10/100 Adapter w/WOL provides the following features:

- Plug-and-play installation for Windows 95 and Windows 98
- 10/100 autonegotiation
- Wake on LAN (WOL) capability

Product Description

The BayStack 21 PCI 10/100 Adapter w/WOL is a standard-size PC card. The WOL cable allows you to connect the network card to your workstation and enable the WOL feature.

BayStack 21 Network Card

The BayStack 21 PCI 10/100 Adapter w/WOL includes the following components:

- RJ-45 port
- 10 megabits per second (Mb/s) and 100 Mb/s Link LEDs
- Activity LED
- WOL cable and connector

RJ-45 Ethernet Port

The RJ-45 10BASE-T/100BASE-TX Ethernet port connects the network card to a network device, such as a hub. The port adapts to the correct network speed of 10 Mb/s or 100 Mb/s through autonegotiation with the board components of the network card. The port is wired as an MDI-X port to connect to other devices without using a crossover cable.

LEDs

The front of the BayStack 21 network card contains three LEDs (Figure 1-1).

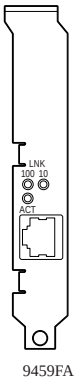

Figure 1-1. Link and Activity LEDs

The 10 Mb/s and 100 Mb/s Link LEDs indicate successful network connections to Ethernet and Fast Ethernet devices, respectively. The Link LEDs remain steady if the connection is stable. You should check the RJ-45 connection if the LED is not steady. The Activity LED indicates active network traffic.

Table 1-1 describes the Link and Activity LED indications.

Table 1-1. LED Indications

Label	Color	Activity	Description
10 LNK	Green	On	A 10 Mb/s connection has been established.
		Off	Power is not supplied to the network card, or a 10 Mb/s connection is not established.
100 LNK	Green	On	A 100 Mb/s connection has been established.
		Off	Power is not supplied to the network card, or a 100 Mb/s connection is not established.
ACT	Green	On	Heavy network traffic is passing through the port.
		Blinking	Intermittent or light network traffic is passing through the port. The rate of blinking is proportional to the amount of network traffic.

WOL Cable and Connector

The WOL cable (Figure 1-2) is an interconnect cable with standard 3-pin connectors on each end.

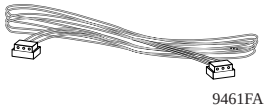

Figure 1-2. WOL Cable

The WOL cable includes the following three wires:

- A network card auxiliary power supply line, which maintains constant low-level power to the motherboard
- A card wake-up signal line, which turns on the workstation remotely
- A ground line, which provides electrical grounding

One end of the cable connects to the motherboard of your workstation. The other end attaches to the WOL connector (Figure 1-3) on the board of the BayStack 21 network card.

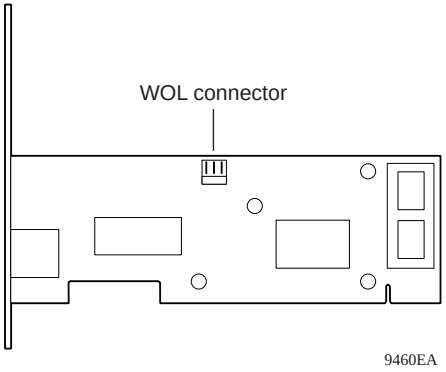

Figure 1-3. WOL Connector

System Requirements

Workstations using the BayStack 21 PCI 10/100 Adapter w/WOL must meet the following requirements:

- Microsoft Windows 95, Windows 98, or Windows NT
- PCI expansion slot with bus mastering capability

Operating Environments

The BayStack 21 network card supports the operating systems and associated drivers listed in Table 1-2.

Table 1-2. Supported Operating Systems

Driver	Operating Systems
ODI Drivers	• Novell NetWare 3.12, 4.1, 4.11 • Novell LAN Analyzer
NDIS 2.0 Drivers	• Microsoft LAN Manager • IBM LAN Server • IBM LAN Support • DEC PATHWORKS
NDIS 3.0 Drivers	• Windows for Workgroups 3.11 • Windows 95 • Windows NT 3.51
NDIS 4.0 Drivers	• Windows 95 OSR2, 98, NT 4.0
NDIS 5.0 Drivers	• Windows 98
Packet Drivers	• FTP PC/TCP • NCSA TCP/IP
UNIX Drivers	• SCO UNIX • Linux

Cable Requirements

You can use Category 5 (Cat 5) Ethernet cables for 10 Mb/s and 100 Mb/s network connections to the BayStack 21 network card.

Use the following guidelines when using Cat 5 cables:

- Maximum length between a workstation and a hub is 100 meters (m).
- Maximum length between two hubs is 10 m.
- Maximum length between two hubs which are functioning as Ethernet Class 2 Repeaters is 100 m.
- Maximum total length between two workstations is 205 m.

Fast Ethernet Cables (100 Mb/s)

You must use a Cat 5 straight-through cable with one RJ-45 connector on each end for 100 Mb/s Ethernet connections. Do not use a crossover cable.

Ethernet Cables (10 Mb/s)

You can use Cat 3, Cat 4, or Cat 5 unshielded twisted pair (UTP) cable or an EIA/TIA-568 100 ohm shielded twisted pair (STP) cable for 10 Mb/s Ethernet connections. You must use a straight through cable with one RJ-45 connector on each end. Do not use a crossover cable.

Chapter 2
Hardware Installation

This chapter describes how to install the BayStack 21 PCI 10/100 Adapter w/ WOL in an end-user workstation such as a desktop computer or server.

Package Contents

The BayStack 21 network card package contains the following:

- BayStack 21 PCI 10/100 Adapter w/WOL with one RJ-45 port
- WOL cable
- *BayStack 21 PCI 10/100 Adapter w/WOL Software & Documentation* CD, including technical documentation in PDF format
- Safety card
- Warranty/Registration card

Caution: Touch a grounded metal object to free yourself of static electricity prior to handling the network card.

Installing the BayStack 21 PCI 10/100 Adapter w/WOL

To install the BayStack 21 network card in a workstation:

1. **Shut down the workstation.**
2. **Unplug the workstation power cord from the power source.**
3. **Remove the chassis cover of the workstation.**
4. **Locate an available PCI bus master expansion slot in the workstation.**
5. **Remove the protective bracket from the slot.**
6. **Insert the contact edge of the BayStack 21 network card into the slot.**
7. **Make sure all edge connectors of the network card are firmly seated in the slot.**
8. **Install and secure the bracket screw to secure the network card to the chassis.**
9. **If you plan to install the WOL cable, proceed to "Connecting the WOL Cable" on page 2-3. Otherwise, continue with steps 10 through 12.**
10. **Replace the chassis.**
11. **Install a standard Ethernet cable to the BayStack 21 network card**.
    a. **Plug one end of the network cable into the RJ-45 connector of the network card.**
    b. **Plug the other end of the network cable into an RJ-45 port on the network device.**
12. **Reconnect the power cord and turn the workstation on.**

Note: If the Basic Input/Output System (BIOS) section of your workstation boot program is "Plug and Play" compliant, the BIOS will automatically configure a newly installed network card.
If the BIOS program has assigned your network card an interrupt number that is already assigned to another device, both devices will fault. If you detect this problem, you must run the CMOS Setup Utility to manually assign a nonconflicting interrupt number.

Connecting the WOL Cable

To install the WOL cable between the BayStack 21 network card and the chassis:

1. **Make sure that the workstation is disconnected from the power source and the chassis cover has been removed.**
2. **Connect one end of the WOL cable to the network card WOL connector.**

   You can use either connector on the WOL cable; they are identical. Refer to Figure 1-3 on page 1-5 for the location of the WOL connector on the network card.
3. **Identify the WOL connector location on the workstation motherboard.**

   The location of the connector is system dependent. You may see "WOL" written on the motherboard.
4. **Connect the other end of the WOL cable to the motherboard.**

Caution: If the WOL connector on the motherboard does not fit the connector on the WOL cable, or if the WOL connector does not have three pins, do not force the connection or alter the components. Using an incorrect connector can damage the workstation.

5. **Replace the chassis.**
6. **Install a standard Ethernet cable to the BayStack 21 network card.**
   a. **Plug one end of the network cable into the RJ-45 connector of the network card.**
   b. **Plug the other end of the network cable into a port on the network hub.**
7. **Reconnect the power cord and turn the workstation on.**
8. **Press the Delete key to enter the BIOS CMOS Setup.**
9. **Enable the WOL function or the power-on function of the workstation.**

   The name of this function is architecture dependent. The function may be located in a category heading such as "Power Management."
10. **Test the WOL function from the workstation you just connected or from another remote workstation that has a network card installed.**

Chapter 3
Software Installation

This chapter provides instructions for installing the Windows- and Novell NetWare-based BayStack 21 network driver software and configuring the BayStack 21 PCI 10/100 Adapter w/WOL on your network. This chapter describes procedures for Windows 95, Windows 98, Windows NT, and Novell NetWare 4.x. Drivers for other operating systems are available but not discussed in this guide. You can access information for installing other drivers from the *BayStack 21 PCI 10/100 Adapter w/WOL Software & Documentation* CD.

Different versions of Windows may have different installation screens than those shown in these instructions. Your installation screens may appear in a different order than the screens in this chapter, or you may encounter more or fewer screens. You will be prompted for the same information, regardless of the Windows version.

The driver starts automatically for Windows 95 and Windows 98. Nortel Networks recommends using the automatic process to take advantage of this "plug-and-play" capability. The driver must be manually configured for Windows NT.

Preinstallation

Perform the following tasks prior to installing the BayStack 21 network driver:

- You must install the BayStack 21 network card before installing the BayStack 21 network driver.
- You must have the Windows 95 or Windows 98 CD and the BayStack 21 network driver CD ready to use during the installation. You may be prompted to install either CD. You may receive the “Insert Disk” and the “Please insert the disk labeled Windows...” messages. If you get these messages, insert the appropriate CD, enter the appropriate drive letter and CD name, and click OK to continue the installation. For example, if drive D is your CD drive and you insert the Windows 95 CD, enter **d:\win95** when prompted.

Installing the Network Driver in a Windows 95 Environment

This section describes the steps required to install the BayStack 21 network driver in a Windows 95 workstation. Be sure you have performed the tasks in “Preinstallation” on page 3-2 before continuing.

To install the network driver:

1. **Turn on the power to the workstation, and start Windows 95.**

   The New Hardware Found window opens, identifying a generic network card. For instance, the window may list “PCI Ethernet Controller” (Figure 3-1).

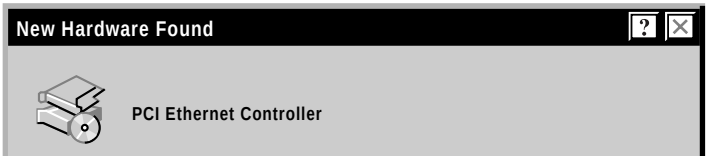

Figure 3-1. New Hardware Found Window—Generic

A second New Hardware Found window opens, identifying your BayStack 21 PCI 10/100 Adapter w/WOL (Figure 3-2).

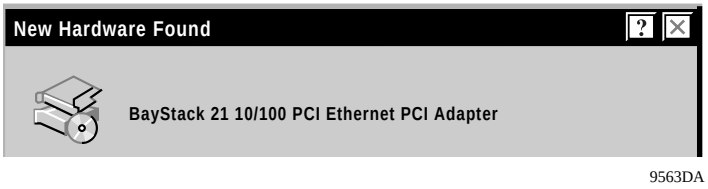

Figure 3-2. New Hardware Found Window—BayStack 21 Network Card

The Building Driver Information Database window opens. You do not have to perform any tasks.

A generic Update Device Driver Wizard dialog box opens (Figure 3-3).

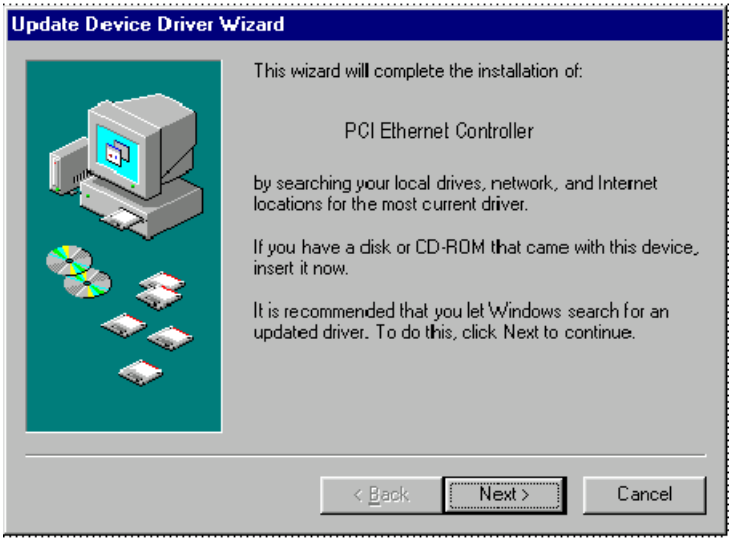

Figure 3-3. Update Device Driver Wizard Dialog Box—Generic

2. **Insert the *BayStack 21 PCI 10/100 Adapter w/WOL Software & Documentation* CD into the CD drive**.

3. **Click Next.**

   The next Update Device Driver Wizard dialog box (Figure 3-4) indicates that the new BayStack 21 network card has been found and the driver is automatically loaded.

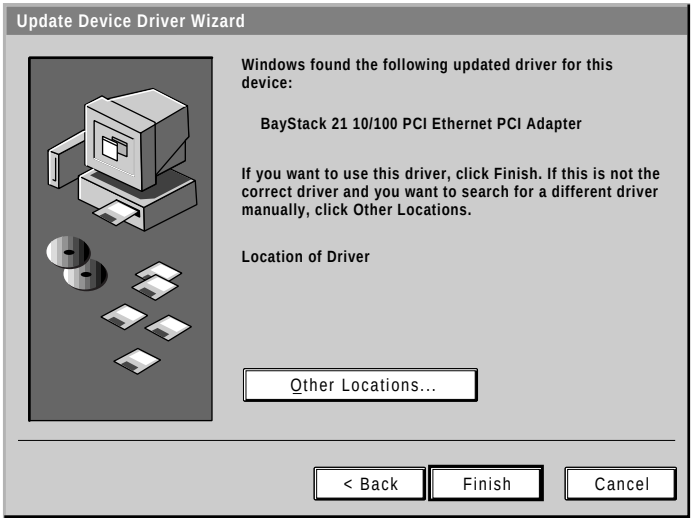

Figure 3-4. Update Device Driver Wizard Dialog Box—BayStack 21 Network Card

4. **Click Finish.**

   The Copying Files dialog box opens (Figure 3-5).

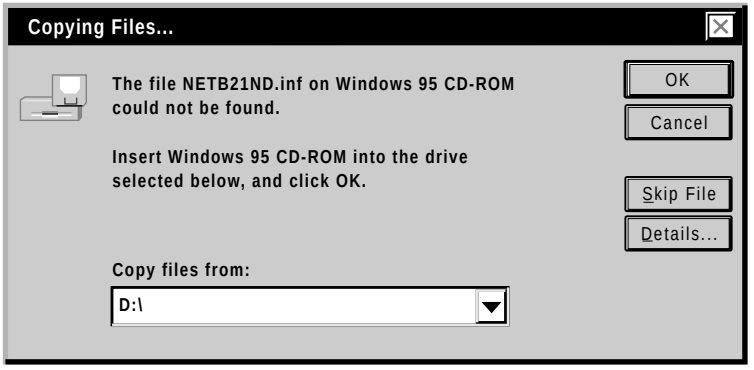

Figure 3-5. Copying Files Dialog Box

5. **Insert the *BayStack 21 PCI 10/100 Adapter w/WOL Software & Documentation* CD as indicated.**
6. **Enter the drive letter of the CD drive into the "Copy files from:" field.**

   For example, if the CD drive in your workstation is drive D, enter **D:**.
7. **Click OK.**

   The Copying Files dialog box opens again.
8. **Insert the Windows 95 CD as indicated.**
9. **Enter D:\WIN95 into the "Copy files from" field.**
10. **Click OK.**

    The System Settings Change dialog box opens.
11. **Remove any CDs from your CD drive.**
12. **Click Yes.**

    Restarting your system is necessary to enable your PC to finish setting up your new hardware.

Configuring the Windows 95 Environment

You must configure the Windows 95 environment on your workstation after you install the BayStack 21 network driver. Configure your workstation identification first, and then configure TCP/IP properties.

Configuring the Workstation Identification

To configure the workstation identification:

1. **From the Windows taskbar, choose Start > Settings > Control Panel.**
2. **Double-click Network.**

   The Network dialog box opens.The configuration tab is displayed by default.
3. **Select the Identification tab (Figure 3-6).**

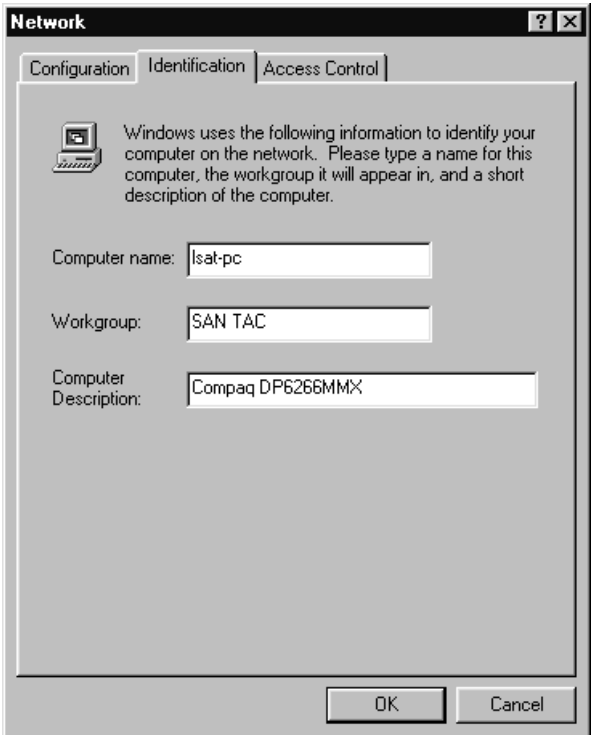

Figure 3-6. Network Dialog Box—Identification Tab

4. **Enter the following information for your workstation:**
   - Computer Name—The name assigned to your workstation by your system administrator
   - Workgroup—Typically, the location or group name assigned by your system administrator
   - Computer Description—The manufacturing description; usually appears by default
5. **Click OK.**

   Files automatically copy. The Copying Files dialog box opens.
6. **Enter the location of the requested files or CD in the "Copy files from:" field.**
7. **Click OK.**

   The System Settings Change dialog box opens (Figure 3-7).

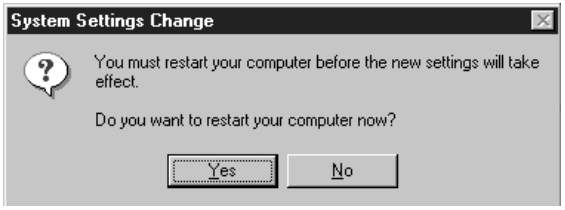

Figure 3-7. System Settings Change Dialog Box

Restarting your system is necessary to enable your PC to finish setting up your new hardware.

8. **Remove any CDs from your CD drive.**
9. **Click Yes.**

   Your system will restart.

Configuring the Network Properties

To configure the network properties of your workstation, such as TCP/IP protocols:

1. **From the Windows taskbar, choose Start > Settings > Control Panel.**
2. **Click Network.**

   The Network dialog box opens. The configuration tab (Figure 3-8) is displayed by default.

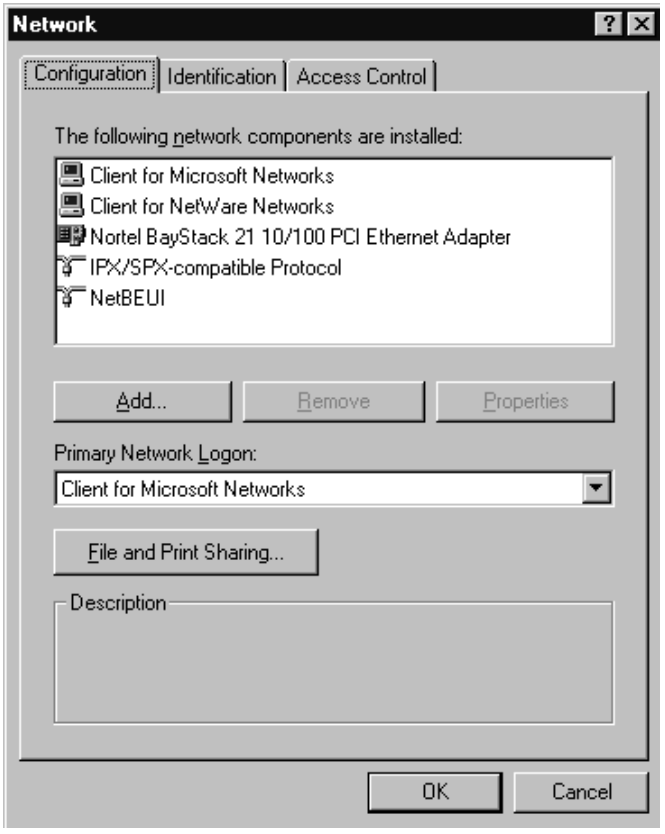

Figure 3-8. Network Dialog Box—Configuration Tab

3. **Click Add.**

   The Select Network Component Type dialog box opens (Figure 3-9).

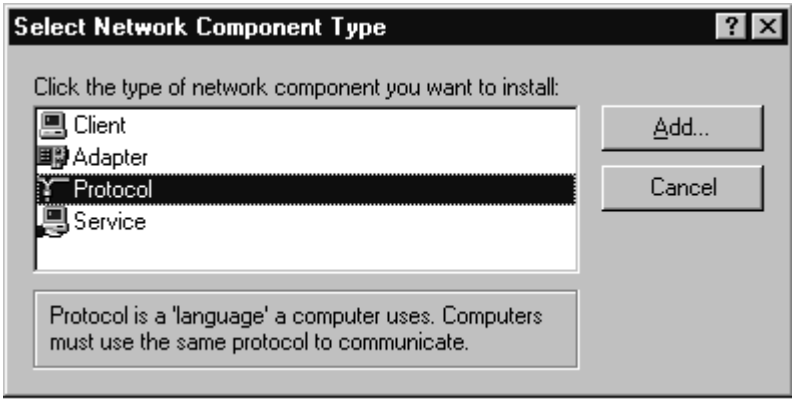

Figure 3-9. Select Network Component Type Dialog Box

4. **Select Protocol.**
5. **Click Add.**

   The Select Network Protocol dialog box opens (Figure 3-10).

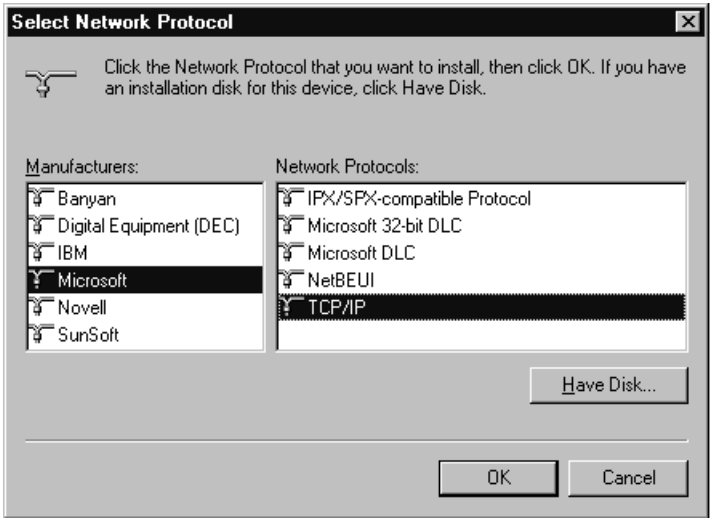

Figure 3-10. Select Network Protocol Dialog Box

6. **In the Manufacturers list, select Microsoft.**
7. **In the Network Protocols list, select TCP/IP.**
8. **Click OK.**
9. **Return to the Configuration tab.**
10. **Select Nortel BayStack 21 10/100 PCI Ethernet Adapter (Figure 3-11).**

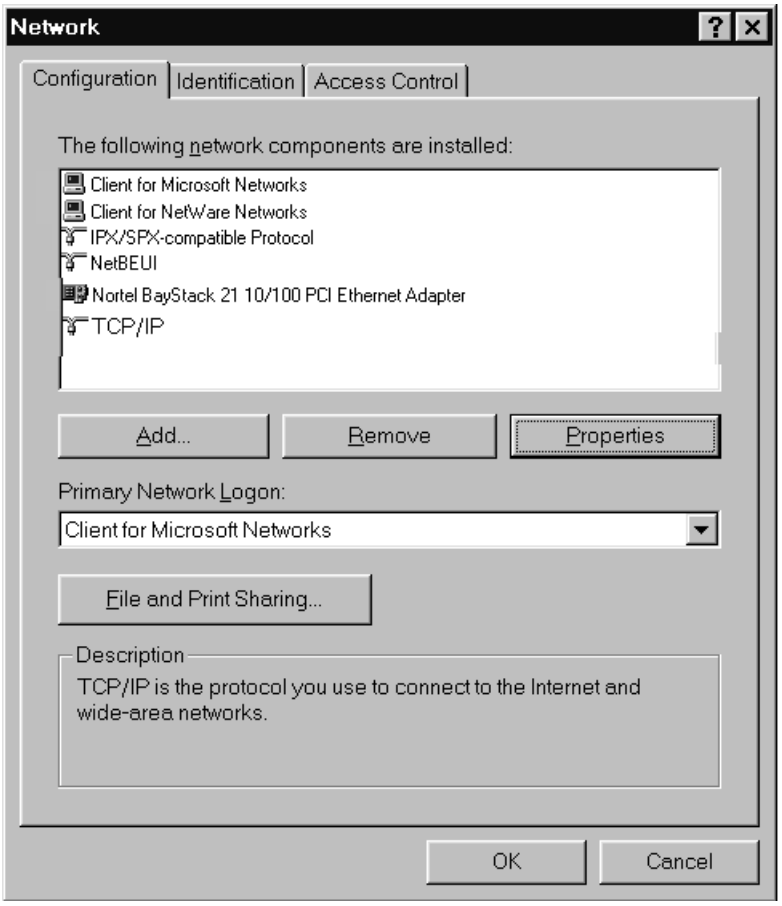

Figure 3-11. Configuration Tab, BayStack 21 Network Card Selected

11. **Click Properties.**

    The TCP/IP Properties dialog box opens (Figure 3-12).

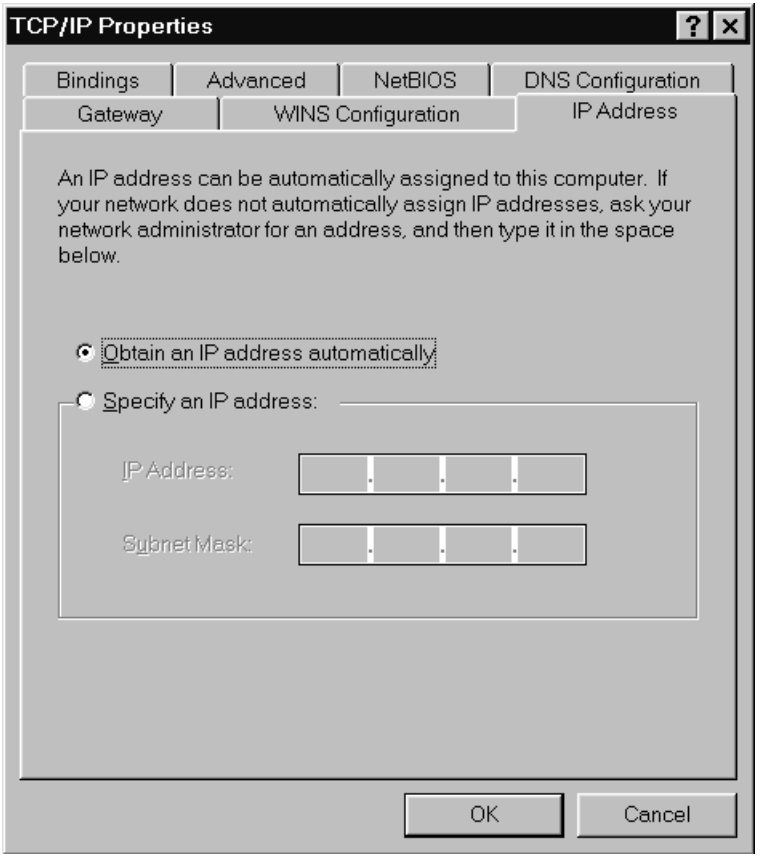

Figure 3-12. TCP/IP Properties Dialog Box

12. **Select the IP Address tab.**

13. **If the workstation has a static IP address, specify the IP address, subnet mask, and default gateway of your workstation.**

    You can also choose the “Obtain an IP address automatically” option if the workstation does not have a static IP address. If you choose this option, your IP address will be supplied by a DHCP server.

14. **Use the Gateway or DNS Configuration tabs to configure other parameters, as needed.**
15. **Click OK.**

    The Copying Files dialog box opens.
16. **In the "Copy files from:" field, enter the location of the requested files or CD.**
17. **Click OK.**

    The system restart dialog box opens. Restarting your system is necessary to enable your PC to finish setting up your new hardware.
18. **Remove all CDs from the CD drive.**
19. **Click Yes.**

    Your system restarts.

Installing the Network Driver in a Windows 98 Environment

This section describes the steps required to install the BayStack 21 network driver in a Windows 98 workstation.

To install the network driver:

1. **Turn on the power to the workstation, and start Windows 98.**

   The New Hardware Found window opens, identifying a generic network card. For instance, the window may list "PCI Ethernet Controller" (Figure 3-13).

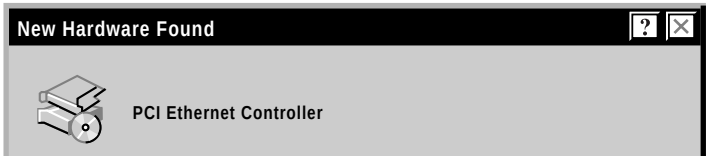

Figure 3-13. New Hardware Found Window—Generic

A second New Hardware Found window opens, identifying your BayStack 21 PCI 10/100 Adapter w/WOL (Figure 3-14).

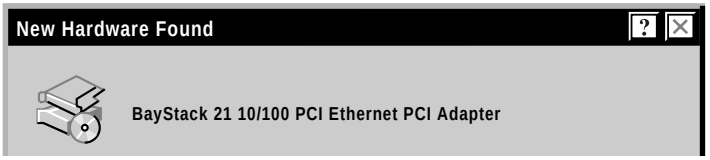

Figure 3-14. New Hardware Found Window

The Copying Files dialog box opens (Figure 3-15).

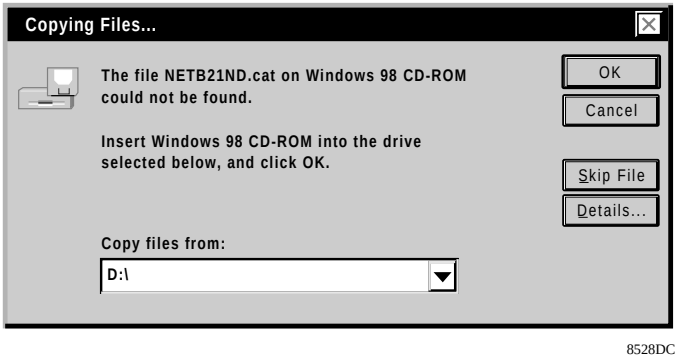

Figure 3-15. Copying Files Dialog Box

2. **Insert the required CD into the CD drive of your workstation.**
3. **Enter the location and file name of the CD in the "Copy files from:" field.**

   For instance, enter **D:\nt_9x** if you inserted the Windows 98 CD into drive D.

4. **Click OK.**

   The Copying Files dialog box opens (Figure 3-16).

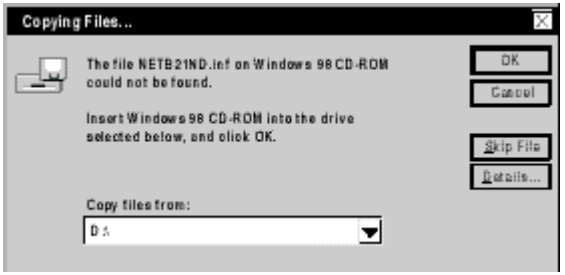

Figure 3-16. Copying Files Dialog Box

5. **Insert the required CD into the CD drive of your workstation.**
6. **Enter the location and file name of the CD in the "Copy files from:" field.**
7. **Click OK.**

   The install program searches the CD. The New Hardware Found dialog box opens (Figure 3-17).

Figure 3-17. New Hardware Found Dialog Box

8. **Select one of the following options:**
   - Driver from disk provided by hardware manufacturer (recommended by Nortel Networks)
   - Do not install a driver (Windows will not prompt you again)
   - Select from a list of alternate drivers
9. **Click OK.**

   The System Settings Change dialog box opens (Figure 3-18).

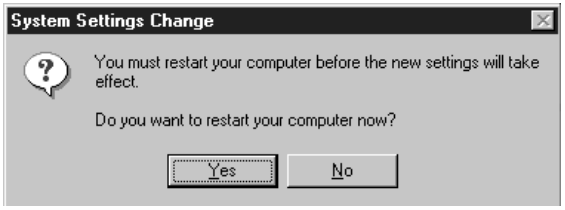

Figure 3-18. System Settings Change Dialog Box

   Restarting your system is necessary to enable your PC to finish setting up your new hardware.

10. **Remove all CDs from the CD drive.**
11. **Click Yes.**

    Your system restarts.

Configuring the Windows 98 Environment

You must configure the Windows 98 environment on your workstation after you install the BayStack 21 network driver.

Configuring the Network Properties

To configure the network properties for your workstation:

1. **From the Windows taskbar, choose Start > Settings > Control Panel.**
2. **Double-click Network.**

   The Network dialog box opens. The TCP/IP network protocol for the BayStack 21 network driver is already installed.

   The configuration tab (Figure 3-19) is displayed by default.

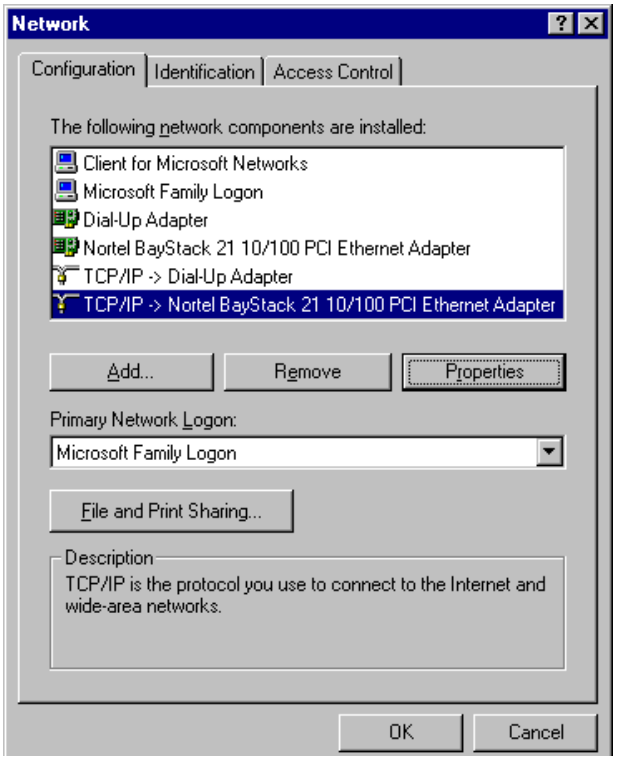

Figure 3-19. Network Dialog Box—Configuration Tab

3. **Select Nortel BayStack 21 10/100 PCI Ethernet Adapter.**

4. **Click Properties.**

   The TCP/IP Properties dialog box opens (Figure 3-20).

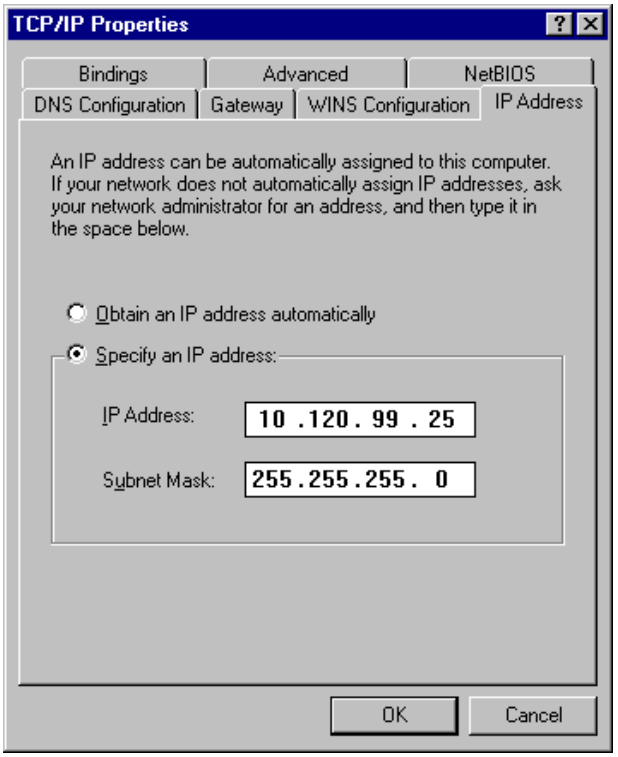

Figure 3-20. TCP/IP Properties Dialog Box

5. **Select the IP Address tab.**
6. **If the workstation has a static IP address, specify the IP address, subnet mask, and default gateway of your workstation.**

   You can also choose the “Obtain an IP address automatically” option if the workstation does not have a static IP address. If you choose this option, your IP address will be supplied by a DHCP server.

7. **Use the Gateway or DNS Configuration tabs to configure other parameters, as needed.**
8. **Click OK.**

   The System Settings Change dialog box opens.

9. **Click Yes.**

   Your system restarts.

Installing the Network Driver in a Windows NT Environment

The Windows NT installation of the BayStack 21 network driver is not automatic. You must install the driver manually.

To install the network driver:

1. **From the Windows taskbar, choose Start > Settings > Control Panel.**
2. **Double-click Network.**

   The Network dialog box opens. The Identification tab is displayed by default.
3. **Select the Adapters tab (Figure 3-21).**

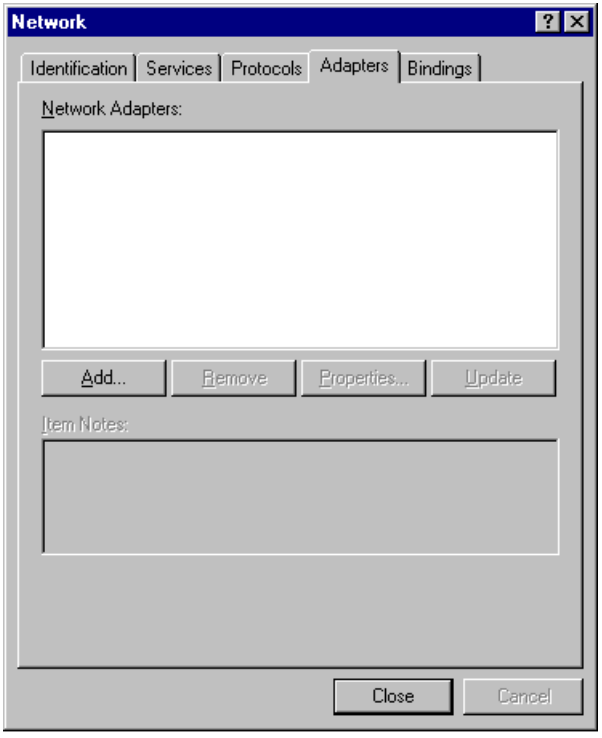

Figure 3-21. Network Dialog Box—Adapters Tab

4. **Select Add.**

   The Select Network Adapter dialog box opens (Figure 3-22).

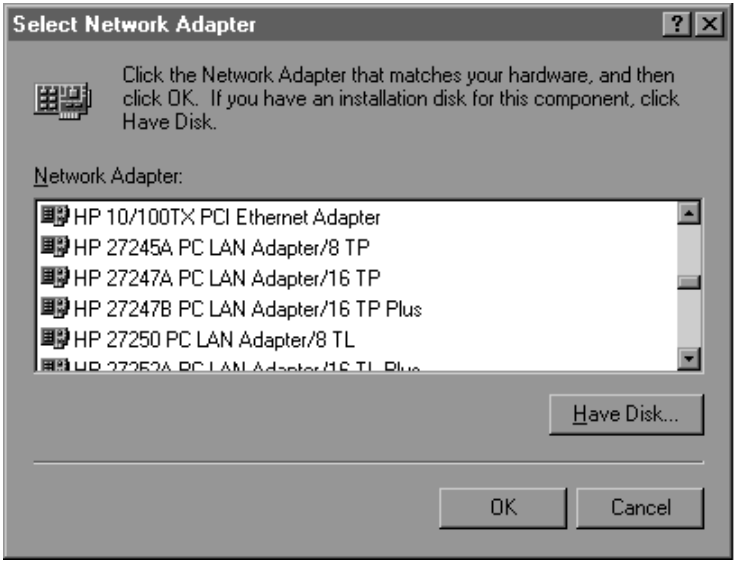

Figure 3-22. Select Network Adapter Dialog Box

5. **Click Have Disk.**
6. **Insert the *BayStack 21 PCI 10/100 Adapter w/WOL Software & Documentation* CD into the CD drive.**
7. **Specify the letter of the drive into which you installed the CD.**

   Typically the CD drive is letter D.

8. **Click OK.**

   The Select OEM Option dialog box opens (Figure 3-23).

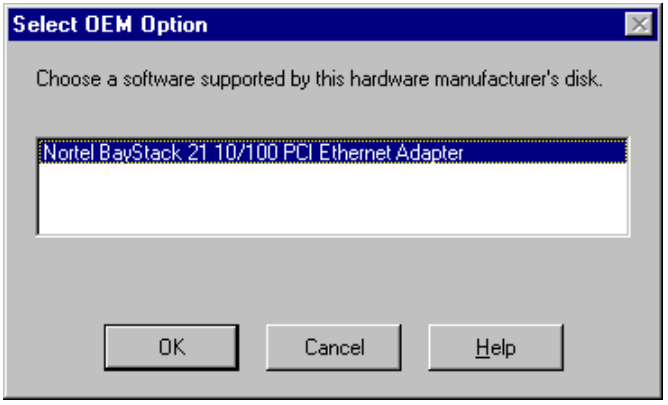

Figure 3-23. Select OEM Option Dialog Box

9. **Select Nortel BayStack 21 10/100 PCI Ethernet Adapter**.
10. **Click OK.**

    The Speed/Duplex Mode dialog box (Figure 3-24) opens. The default mode is Auto.

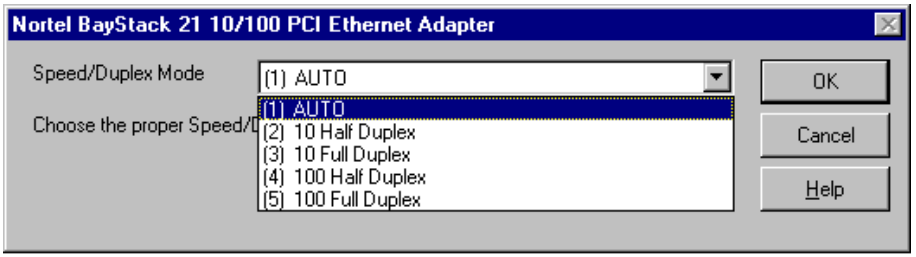

Figure 3-24. Speed/Duplex Mode Dialog Box

11. **Select Auto.**
12. **Click OK.**

Configuring the Network Properties

To configure the network properties for your workstation:

1. **From the Windows taskbar, choose Start > Settings > Control Panel.**
2. **Double-click Network.**

   The Network dialog box opens. The Identification tab is displayed by default.
3. **Click the Protocols tab.**

   The Protocols tab (Figure 3-25) is displayed.

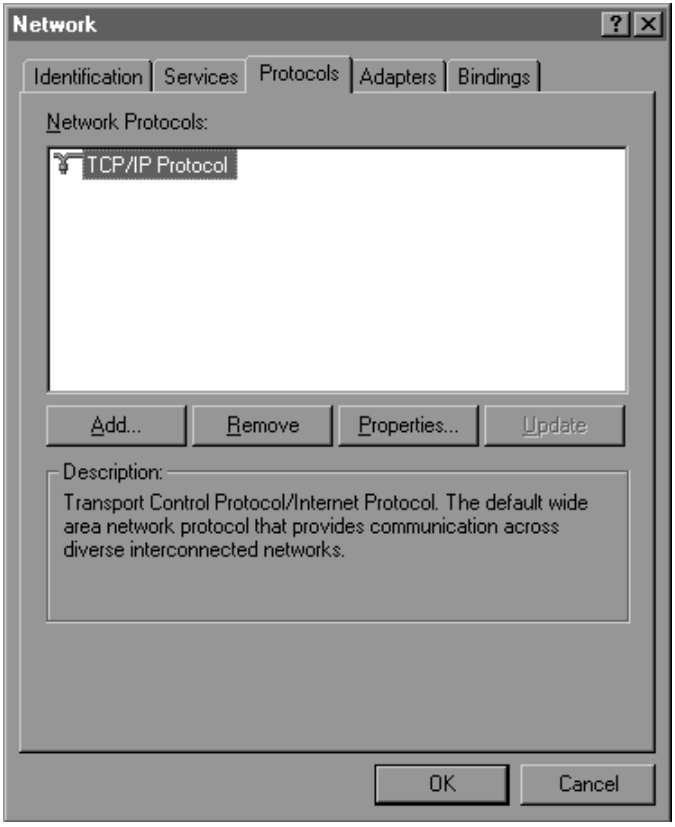

Figure 3-25. Network Dialog Box—Protocols Tab

4. **Click Properties.**

   The Microsoft TCP/IP Properties dialog box opens (Figure 3-26).

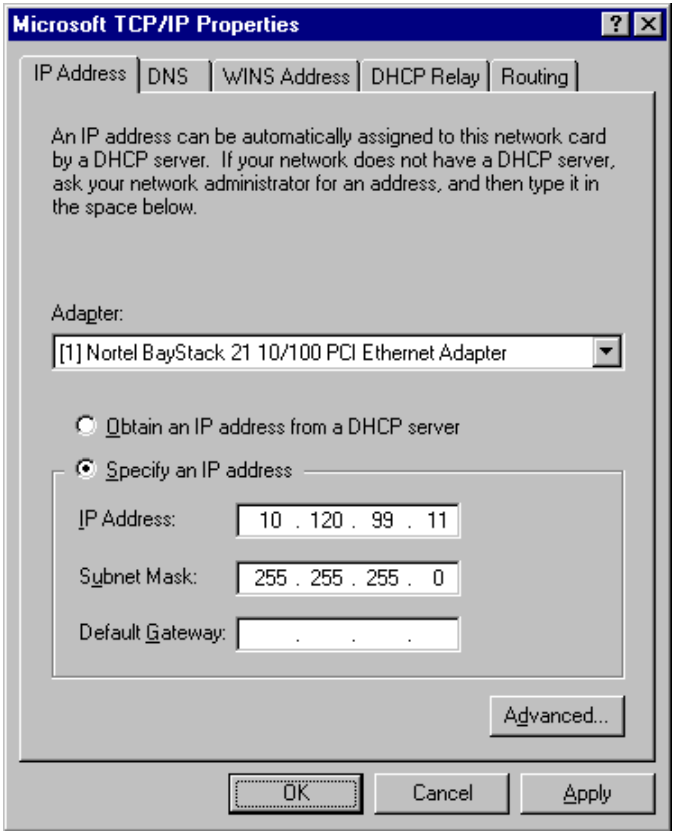

Figure 3-26. Microsoft TCP/IP Properties Dialog Box

5. **If the workstation has a static IP address, specify the IP address, subnet mask, and default gateway of your workstation.**

   You can also choose the "Obtain an IP address from a DHCP server" option if the workstation does not have a static IP address.

6. **Use the DNS tab to add additional network parameters, if needed.**

7. **Click OK.**

8. **Click Close.**

   The System Settings Change dialog box opens. Restarting your system is necessary to enable your PC to finish setting up your new hardware.

9. **Click Yes.**

   Your system restarts.

Installing the Network Driver in a Novell NetWare 4.x Environment

This section describes the steps required to install the BayStack 21 network driver software in a Novell NetWare version 4.x environment. You must install and configure the software on your Novell server and client.

If you are installing the BayStack 21 network driver software in a Novell NetWare version 3.12 environment, refer to the *Readme.txt* file on the *BayStack 21 PCI 10/100 Adapter w/WOL Software & Documentation* CD.

Installing the Network Driver in a Novell NetWare Server

To install the BayStack 21 network driver in a Novell NetWare server:

1. **Verify that your Novell NetWare server includes the following files:**
   - *\NETWARE\SERVER\4.X\MSM.NLM* (Media Support Module)
   - *\NETWARE\SERVER\ETHERTSM.NLM* (Topology Specific Module for Ethernet)
2. **Change to the Novell NetWare server directory.**

   For instance, type the command:

   CD\NWSERVER
3. **Type:**

   SERVER
4. **Press Enter.**
5. **At the server prompt, enter:**

   LOAD INSTALL
6. **From the Installation Options menu, select Driver options.**

7. **Press Enter.**
8. **From the Driver Options menu, select Configure network drivers.**
9. **Press Enter.**
10. **From the Additional Driver Actions menu, select Select a driver.**
11. **Press Enter.**
12. **Press Insert to install an unlisted driver.**

    By default, your a: drive is scanned.
13. **Press <F3> to specify another path or drive.**
14. **Insert the *BayStack 21 PCI 10/100 Adapter w/WOL Software & Documentation* CD into the CD drive of your server.**
15. **Press Enter.**

    The following file automatically copies from the *BayStack 21 PCI 10/100 Adapter w/WOL Software & Documentation* CD to your Novell NetWare server:

    - *\NETWARE\SERVER\B21LAN10.LAN*
16. **From the Select a driver to install: menu, select Nortel 21 10/100 PCI Ethernet Driver.**
17. **Press Enter.**

    The "Do you want to copy driver B21LAN10.LAN (Y)(N)" message is displayed.
18. **Select Yes.**
19. **Proceed to the next section if you want to specify driver parameters.**

Specifying Driver Parameters

The BayStack 21 network driver installs with default parameters. You can set specific driver parameters for the server.

To set specific driver parameters:

1. **From the Board B21LAN10_ 1 (Driver B21LAN10) Actions menu, select "Select/Modify driver parameters and protocols."**
2. **Press Enter.**

   The default protocol is IPX. You can also select TCP/IP or AppleTalk.
3. **Select a protocol from the available options.**
4. **Specify the slot number (slot #).**
5. **Select "Save parameter and load select driver."**

   If you select the IPX protocol, the network number (network #) is randomly generated.
6. **Press Enter at each of the following four prompts:**
   - 802.3
   - 802.2
   - SNAP
   - Ethernet II

Installing the Network Card in a Novell NetWare Client

To install the BayStack 21 network driver in your Novell NetWare client:

1. **Verify that your BayStack 21 network card is properly installed in your Novell NetWare workstation.**
2. **Insert the *BayStack 21 Network Driver CD* into the CD drive in your workstation.**
3. **Access the Novell NetWare client directory.**
4. **Copy the following command to the client directory:**

   \NETWARE\DOSODI\B21ODI10.COM

5. **Enter the following commands, in order:**

   lsl
   b21odi10
   ipxodi
   netx (or **vlm**)

6. **Press Enter.**

   You can now log in to your network.

7. **Edit the *NET.CFG* file to change driver parameters.**
8. **Verify that there is a protocol binding for Ethernet 802.3 in the *NET.CFG* file.**

   Refer toAppendix B, “Novell NetWare Reference Information” for sample *NET.CFG* files.

Chapter 4
Using the WOL Feature

You can use the Wake On LAN (WOL) feature to start up remote workstations without end-user intervention. A BayStack 21 PCI 10/100 Adapter w/WOL must be installed on each workstation that you want to start remotely. You must set up each workstation prior to using the WOL feature.

Setting Up the Workstation

Perform the following tasks prior to using the WOL feature on a remote workstation:

- Make sure the WOL connector is attached to the BayStack 21 network card and to the motherboard of the workstation.

  Refer to "Connecting the WOL Cable" on page 2-3 for instructions.

- Place the workstation in sleep (or standby) mode, or turn the workstation off completely.

Running the WOL Feature

You must have a WOL-capable utility on the workstation from which you are using the WOL feature to turn on remote workstations. There are several commercially available utilities. As an example, instructions for using the AMD Magic Packet Utility are provided in this section. You can obtain this utility from *www.amd.com*. Procedures for utilities from other companies vary.

To use the WOL feature:

1. **Open a WOL utility, such as the Magic Packet Utility (Figure 4-1).**

Figure 4-1. Magic Packet Utility Window

2. **From the Magic Packet Utility menu, select Magic Packets > Create a List of Hosts.**

   The Create a List of Hosts on LAN dialog box opens (Figure 4-2).

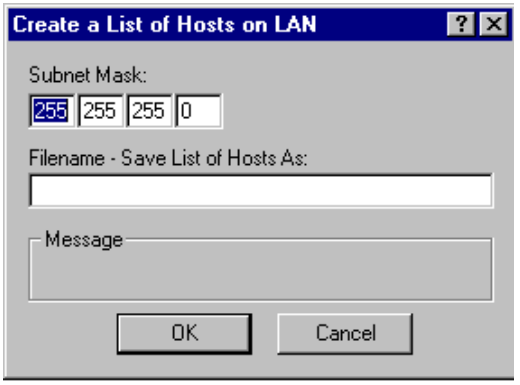

Figure 4-2. Create a List of Hosts on LAN Dialog Box

3. **Enter the subnet mask of the remote workstation you want to turn on.**

   The utility maps, or locates, BayStack 21 network cards in the subnet you specified. Make sure the remote workstation is still turned on. It should not be in standby or shutdown mode.

4. **Click OK.**

   The Magic Packet Utility identification window opens (Figure 4-3).

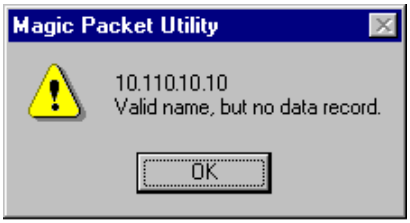

Figure 4-3. Magic Packet Utility Identification Window

5. **Click OK.**

   The NewGroup window opens (Figure 4-4), displaying information about the remote workstation you want to turn on.

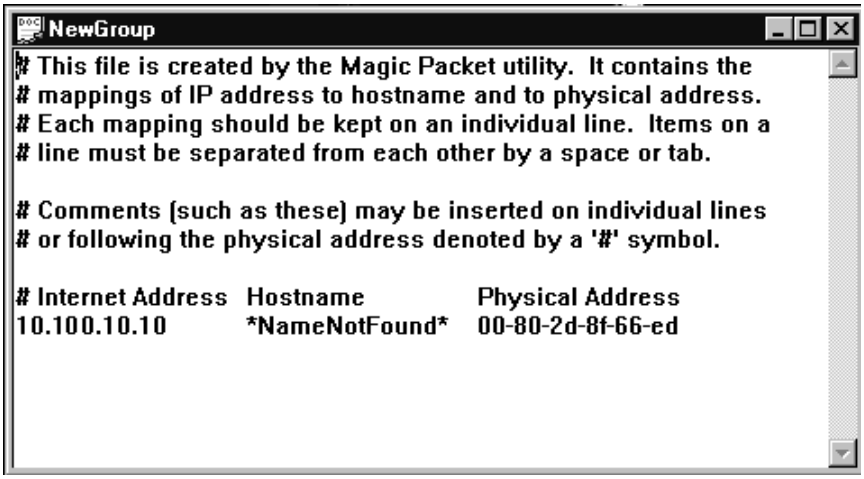

Figure 4-4. NewGroup Window

You can now turn on the remote workstation. Continue with these instructions when the workstation is in standby or shutdown mode.

6. **Return to the Magic Packet Utility menu.**
7. **Select Magic Packet > Power on One Host.**

   The Send a Magic Packet to One Host dialog box opens (Figure 4-5).

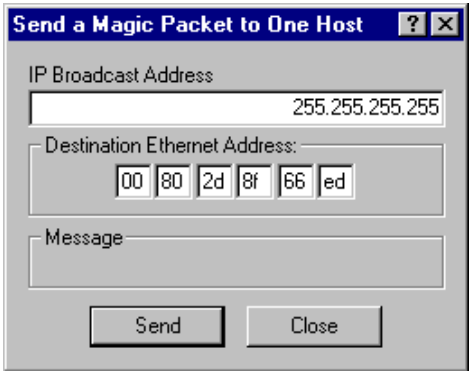

Figure 4-5. Send a Magic Packet to One Host Dialog Box

8. **Enter the physical address of the remote workstation you want to turn on. Do not enter the IP address.**
9. **Click Send.**

   The utility sends a packet to the BayStack 21 network card on the remote workstation to turn on the workstation.
10. **Click Close.**

Chapter 5
Troubleshooting

This chapter provides several methods for troubleshooting problems related to the BayStack 21 PCI 10/100 Adapter w/WOL.

Diagnostic LEDs

Three LEDs on the front of the BayStack 21 network card provide diagnostic information. The 10 Mb/s and 100 Mb/s Link LEDs indicate successful network connections to Ethernet and Fast Ethernet devices, respectively. The Link LEDs remain steady if the connection is stable. You should check the RJ-45 connection if the LED is not steady. The Activity LED indicates active network traffic.

Table 5-1 describes the Link and Activity LED indications.

Table 5-1. LED Indications

Label	Color	Activity	Description
10 LNK	Green	On	A 10 Mb/s connection has been established.
		Off	Power is not supplied to the network card, or a 10 Mb/s connection is not established.
100 LNK	Green	On	A 100 Mb/s connection has been established.
		Off	Power is not supplied to the network card, or a 100 Mb/s connection is not established.
ACT	Green	On	Heavy network traffic is passing through the port.
		Blinking	Intermittent or light network traffic is passing through the port. The rate of blinking is proportional to the amount of network traffic.

Hardware Issues

Perform the following tasks to check for hardware problems:

- Verify that you are using the correct cables and the correct cable lengths, as described in "Cable Requirements" on page 1-7.
- Make sure the network cable is firmly connected to the network card and to a network device.
- Connect the Ethernet cable to a different port on the network device.
- Verify that the BayStack 21 network card is fully and firmly seated in the slot connector in the workstation chassis. Check the connector edges of the card for damage.
- Replace the network card in question with a network card that you are sure functions properly. Run generic network interface card diagnostic tests.
- Install the network card in question into another workstation and run the tests again.
- Remove all other network cards from the workstation and run the tests again. If the verification/diagnostic run is not normal, there is probably an interrupt number conflict. You must manually resolve the conflict by running a CMOS Setup utility after you have reinstalled the expansion cards.

Software Issues

Perform the following tasks to check for software problems:

- Verify that the proper driver is loaded, as explained in Chapter 3, "Software Installation." Be sure you followed the directions for the operating system you are running on the workstation.
- Check that the new configurations match the configurations of the network device if you have manually configured the speed or mode of the network card. Nortel Networks recommends setting the network card to autonegotiation when installing the network driver.

- Verify that the PCI slot in the workstation is an enabled bus-master slot. Do not use a slave PCI slot for the BayStack 21 network card. Some computers may require that you configure the PCI slot to enable bus mastering. Refer to your computer manual for information about the PCI BIOS setup program.

  Be sure that the slot is configured for level-triggered interrupts. It should not be configured for edge-triggered interrupts. Table 5-2 describes typical PCI parameter configurations. Parameters may vary in different systems.

Table 5-2. Typical PCI Slot Parameters

Parameter	Configuration
PCI Slot #	Slot number where the network card is installed
Master	Enabled
Slave	Enabled
Latency Timer	40 (range: 20 to 255)
Interrupt Type	Level-triggered
Interrupt Number	Choice of any number that the BIOS setup program supplies. (The interrupt number should not conflict with other installed cards.)

- Verify that your BIOS software correctly supports the PCI Local Bus Specification, version 2.0 or later. Upgrade your BIOS software if needed.
- Determine whether or not the network card slot is deactivated at the BIOS level. Use the CMOS Setup utility in your workstation to provide the option to activate or deactivate slots.
- Disable the Plug and Play option (PnP) in the BIOS setup program, if your computer does not require this option. Incorrectly assigned resources between network cards may cause a problem.

Note: Always consult your computer manual for information about changing motherboard jumper and BIOS settings. If you modify the BIOS settings, make sure the jumper and BIOS settings match.

- You may need to reserve interrupts and memory addresses for installed Industry Standard Architecture (ISA) cards to prevent PCI cards from using the same settings. Refer to your PC manual for instructions.

Appendix A
Technical Specifications

Tables in this appendix provide technical product specifications and list the available software drivers for the BayStack 21 PCI 10/100 Adapter w/WOL.

Product Specifications

Table A-1 lists technical specifications for the BayStack 21 network card.

Table A-1. Technical Specifications

Standards Compatibility	IEEE 802.3 10BASE-T IEEE 802.3u 100BASE-TX PCI bus V2.2 ACPI OnNow/PC98
EMC Compliance	
CE Mark:	EN50081-1 EN55022 IEC1000-4-2/3/4/6
Emissions:	FCC Class B VCCI Class B Industry Canada Class B EN55022 (CISPR 22) Class B
Physical Dimensions	
Network Card:	120 x 53.5 mm (4.72 x 2.11 in)
WOL Cable:	298 mm (11.75 in) (not including connectors)
Weight	55g (1.94 oz)

Table A-1. Technical Specifications (continued)

Environment	
Operating:	0° to 50° C (32° to 122° F)
Humidity:	5% to 95%, noncondensing
Power Consumption	+5 V DC at 145mA (Standby) +5 V DC at 300mA (Transmit)
Network Interface	
10BASE-T:	RJ-45 (UTP Cable, Categories 3, 4, 5)
100BASE-TX:	RJ-45 (UTP Cable, Category 5)
Data Interface	32-bit bus-mastering PCI
I/O Address	Automatically determined by configuration space
Interrupt	INT A, mapping to BIOS IRQ setup
LED Indicators	10 Mb/s, 100 Mb/s, Activity

Software Drivers

Table A-2 lists the available software drivers for the BayStack 21 PCI 10/100 Adapter w/WOL. Refer to Chapter 3, "Software Installation," for installation instructions regarding the Windows-based drivers. Refer to the README files associated with other drivers for installation instructions.

Table A-2. Available Software Drivers

Driver	Compatible Operating Systems
Microsoft	Windows 95/Windows 98 Windows NT 3.51, 4.0 Windows for Workgroups 3.11 LAN Manager 2.x
Novell NetWare	NetWare 3.1x, 4.x
	32-bit ODI driver
	16-bit DOS ODI driver
	Client32 for Windows 95
SCO	UNIX 3.2.4 ODT 5.0
Other	NDIS2 DOS Mode Driver Packet Driver

Appendix B
Novell NetWare Reference Information

This appendix provides reference files and information for your Novell NetWare 4.x operating system. Server and client information is provided in the following sections.

If you are installing the BayStack 21 PCI Network Driver software in a Novell NetWare version 3.12 environment, refer to the *Readme.txt* file on the *BayStack 21 PCI 10/100 Adapter w/WOL Software & Documentation* CD.

Novell NetWare Server *AUTOEXEC.NCF* Files and Parameters

This section provides information about the Novell NetWare 4.x *AUTOEXEC.NCF* files and parameters.

Sample *AUTOEXEC.NCF* Files

Sample files are provided for workstations that have one or two network cards installed.

One Network Card Installed

The following files are typically part of the *AUTOEXEC.NCF* file, with one network card installed in the workstation:

```
LOAD C:B21LAN10 FRAME=ETHERNET_802.2 NAME=E_8022
LOAD C:B21LAN10 FRAME=ETHERNET_802.3 NAME=E_8023
LOAD C:B21LAN10 FRAME=ETHERNET_II NAME=E_II
LOAD C:B21LAN10 FRAME=ETHERNET_SNAP NAME=E_SNAP

BIND IPX E_8022 NET=10
BIND IPX E_8023 NET=20
BIND IPX E_II NET=30
BIND IPX E_SNAP NET=40
```

Two Network Cards Installed

The following files are typically part of the *AUTOEXEC.NCF* file, with two network cards installed in the workstation:

```
LOAD C:B21LAN10 PCI_SLOT=3 FRAME=ETHERNET_802.2 NAME=E_8022_1
LOAD C:B21LAN10 PCI_SLOT=3 FRAME=ETHERNET_802.3 NAME=E_8023_1
LOAD C:B21LAN10 PCI_SLOT=3 FRAME=ETHERNET_II NAME=E_II_1
LOAD C:B21LAN10 PCI_SLOT=3 FRAME=ETHERNET_SNAP NAME=E_SNAP_1
LOAD C:B21LAN10 PCI_SLOT=4 FRAME=ETHERNET_802.2 NAME=E_8022_2
LOAD C:B21LAN10 PCI_SLOT=4 FRAME=ETHERNET_802.3 NAME=E_8023_2
LOAD C:B21LAN10 PCI_SLOT=4 FRAME=ETHERNET_II NAME=E_II_2
LOAD C:B21LAN10 PCI_SLOT=4 FRAME=ETHERNET_SNAP NAME=E_SNAP_2

BIND IPX E_8022_1 NET=10
BIND IPX E_8023_1 NET=20
BIND IPX E_II_1 NET=30
BIND IPX E_SNAP_1 NET=40
BIND IPX E_8022_2 NET=10
BIND IPX E_8023_2 NET=20
BIND IPX E_II_2 NET=30
BIND IPX E_SNAP_2 NET=40
```

Sample *AUTOEXEC.NCF* File Parameters

This section describes the *AUTOEXEC.NCF* file parameters SLOT, FRAME, NODE, and Medium.

SLOT Parameter

The SLOT parameter specifies which adapter is enabled when multiple BayStack 21 PCI Network Cards are installed in your workstation. The SLOT keyword is an index value corresponding to PCI BIOS. The mapping from the SLOT parameter to the physical PCI slot is different from one workstation to another.

The following are examples of typical SLOT parameters:

```
LOAD C:B21LAN10 SLOT=3 FRAME=ETHERNET_802.2
LOAD C:B21LAN10 SLOT=4 FRAME=ETHERNET_II
```

FRAME Parameter

The FRAME parameter specifies which type of frame is used by the BayStack 21 network driver.

Accepted values include:

- Ethernet_802.3
- Ethernet_802.2
- Ethernet_II
- Ethernet_SNAP

Multiple frame types can be enabled by loading the same driver with different FRAME type parameters.

The following are examples of typical SLOT parameters:

```
LOAD C:B21LAN10 FRAME=ETHERNET_802.2
LOAD C:B21LAN10 FRAME=ETHERNET_802.3
LOAD C:B21LAN10 FRAME=ETHERNET_II
LOAD C:B21LAN10 FRAME=ETHERNET_SNAP
```

NODE Parameter

You can use the NODE parameter to replace the default node address associated with your electrically erasable programmable read-only memory (EEPROM).

The following is an example of a typical NODE parameter:

LOAD B21LAN10 NODE=0000E8001122

Medium Parameter

The Medium parameter specifies which medium type is used by the BayStack 21 network driver. The medium type refers to the transmission type.

Accepted values include:

- AUTO (sense)
- 100FULL (duplex mode)
- 100HALF (duplex mode)
- 10FULL (duplex mode)
- 10HALF (duplex mode)

The following is an example of a typical Medium parameter:

LOAD B21LAN10 SLOT=3 FRAME=ETHERNET_802.2 Medium=100Full

Novell NetWare Client Commands and *NET.CFG* File

This section provides information about commands and the *NET.CFG* file.

Client Commands

Table B-1 briefly describes the commands you enter when installing the BayStack 21 network driver into your Novell NetWare client.

Table B-1. Commands

Command	Description
lsl	Supports the OSI link support layer
b21odi10	Client driver copied from the *BayStack 21 PCI 10/100 Adapter w/WOL Software & Documentation* CD
ipxodi	Default protocol stack
netx (or vlm)	Server connection

Sample *NET.CFG* Files

The MLDI section of the *NET.CFG* file is the section usually edited. The following *NET.CFG* file is a sample:

```
Link Driver B21ODI10
   FRAME Ethernet_802.2
   FRAME Ethernet_802.3
   FRAME Ethernet_II
   FRAME Ethernet_SNAP
   PROTOCOL IPX 0 Ethernet_802.3
   .
   .
   MEDIUM AUTO ;operate on auto negotiation mode
;  MEDIUM 10HALF ;operate on 10M/HalfDuplex mode
;  MEDIUM 10FULL ;operate on 10M/Fullduplex mode
;  MEDIUM 100HALF ;operate on 100M/HalfDuplex mode
;  MEDIUM 100FULL ;operate on 100M/Fullduplex mode
```

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